SLAUGHTER Company
TEST WITH CONFIDENCE

PRICES INCORRECT
CONTACT FACTORY

TECHNICAL MANUAL
No. TM-2
SERIES 103 - 105 - 103/105
122 - 125 - 122/125
INSULATION TESTERS

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SLAUGHTER COMPANY
TEL. 405-223-4774 P. O. BOX 1805 MOORE & HAILEY STS. ARDMORE, OKLAHOMA 73401

SLAUGHTER COMPANY ARDMORE, OKLAHOMA SERIES 103 - 105 - 103/105 - 122 - 125 - 122/125 TM-2

Insulation Testers

WRITE FOR DATA SHEETS ON THE INSTRUMENTS SHOWN . . . ALL ARE STANDARD PRODUCTION MODELS, AVAILABLE FOR IMMEDIATE DELIVERY FROM STOCK . . . LET US QUOTE ON YOUR REQUIREMENTS FOR MODIFIED UNITS OR SPECIAL TEST EQUIPMENT.

SLAUGHTER CO.
MOORE & HAILEY STREETS
ARDMORE, OKLAHOMA
TELEPHONE: 405-223-4773 TWX: 910-830-6972

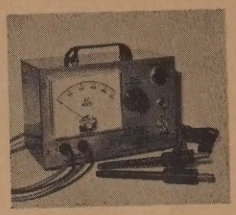
High-voltage Insulation Tester
with buzzer signal on breakdowns
. . . grounds
. . . . shorts

MODEL **101**

Watch what you are doing . . . not the tester

SIX TEST VOLTAGES . . 500 to 2500 V.A.C. PRICED SO YOU CAN AFFORD TO SPOT A FEW ALONG YOUR ASSEMBLY LINES.

Adjustable High-voltage Tester
with buzzer signal on breakdowns
. . . grounds
. . . . shorts

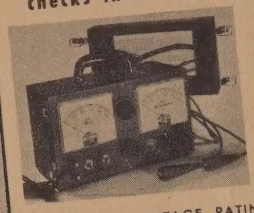


MODEL **106**

Voltmeter shows actual Test Voltage

CONTINUOUSLY VARIABLE TEST VOLTAGE RATINGS TO 10,000 VOLTS AC & DC . . RECOMMENDED FOR BREAKDOWN TESTING AT FINAL ASSEMBLY AND INSPECTION

High-voltage Leakage Tester
checks insulation for . . . leakage
. . . grounds
. . . . . arcing

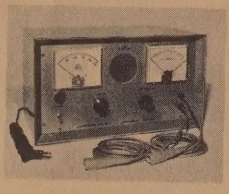


MODEL **122**

16 lb. Portable for lab and field work

VARIABLE VOLTAGE RATINGS TO 2.5 KV AC & DC. DUAL RANGE LEAKAGE METER 0/100/1000 μa. . . . CAPACITY COMPENSATION. . . MEASURES INSULATION RESISTANCE, CAPACITY, POWER FACTOR.

High-voltage Leakage Tester
audibly signals excess leakage
. . . grounds
. . . . . arcing

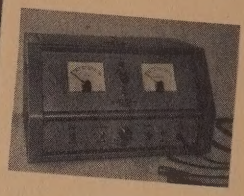


MODEL **103**

Measures Leakage . . . not capacity current

TEST VOLTAGE CONTINUOUSLY VARIABLE ADJUSTABLE LEAKAGE LIMIT. . CAPACITY COMPENSATION ON AC TESTS. . . RATINGS TO 10,000 VOLTS AC & DC. . . . LIMITED ENERGY. . NON-DESTRUCTIVE. . . FOR LAB AND PRODUCTION LINE SERVICE. . . . . .

Automatic H-V Insulation Tester
for precision checking . . . breakdowns
. . . leakage
. . . grounds



MODEL **103-MP**

Automatic Test Cycle

FULLY AUTOMATIC TEST CYCLE. . . CONTROLLED RATE-OF-RISE. . . ADJUSTABLE TEST VOLTAGE, DWELL TIME, & LEAKAGE LIMIT. . . CAPACITY COMPENSATION ON AC TEST. . . FOR PRECISION TEST OF CRITICAL PARTS & ASSEMBLIES. . .

Stroboscopes

WRITE FOR DATA SHEETS ON THE INSTRUMENTS SHOWN . . . ALL ARE STANDARD PRODUCTION MODELS, AVAILABLE FOR IMMEDIATE DELIVERY FROM STOCK . . . LET US QUOTE ON YOUR REQUIREMENTS FOR MODIFIED UNITS OR SPECIAL TEST EQUIPMENT.

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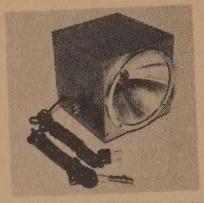
Inspection Stroboscope
. . . with extra high intensity daylight lamp

MODEL **167**

0/600 Flashes per Minute

SUPER INTENSITY TRIGGERED FLASH UNIT . . . PUSH—TO—SEE SWITCH. . . . FOR INSPECTION ON-THE-GO UNDER HIGH AMBIENT LIGHT CONDITIONS.

Inspection Stroboscope
. . . . . with high intensity daylight lamp



MODEL **161**

0/2,000 Flashes per Minute

LIGHT WEIGHT INEXPENSIVE TRIGGERED FLASH UNIT. . . . . PUSH-TO-SEE SWITCH. . . . INTENSE WHITE LIGHT FOR INSPECTION ON —THE —GO

MIDGET STROBOSCOPE FLASH HEAD

MODEL **166**

0/10,000 Flashes per Minute

FOR WORK ON MINIATURIZED EQUIPMENT . . . . FOR PRINTING TRADES. . . . FOR BIO—MEDICAL WORK. . ADAPTS TO ANY SLAUGHTER STROBOSCOPE. . .

Universal Stroboscope
. . . with high intensity daylight lamp

MODEL **163**

110/20,000 Flashes per Minute

UNIVERSAL UNIT FOR MOTION STUDY & INSPECTION ON-THE-GO. . . INSTANT STARTING . . . HIGH INTENSITY WHITE LIGHT . . . . TRIGGER EXTERNALLY OR OPERATE FROM INTERNAL OSCILLATOR

Metered Precision Stroboscope
. . . . . with high intensity daylight lamp

MODEL **165**

110/20,000 Flashes per Minute

PRECISION STROBOSCOPE TACHOMETER INSTANT STARTING. . . HIGH INTENSITY WHITE LIGHT. . . OPERATES FROM EXTERNAL CONTACTS OR INTERNAL OSCILLATOR. . EASILY SYNCHRONIZED. . OUTPUT JACKS TO COUPLE SCOPE, ETC. . . .

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SERIES 101 - 106 - 108 BREAKDOWN TESTERS

Basic units in this family are simple breakdown testers which operate on the principle that at breakdown, the resistance at the failure point falls to a low value and this change is used to trigger audible and visual signals.

The series 101 Tester is a minimum general utility unit providing an AC test voltage. It is available in ratings to 5000 volts RMS. The Series 106 Tester is identical with the Series 101 with the exception that the testing voltage is continuously variable (instead of variation in fixed steps) and a voltmeter, which monitors the actual test voltage, is provided. The Series 106 Tester is available in ratings to 10,000 volts RMS. The Series 108 Tester is identical with the Series 106 except that the testing voltage is DC instead of AC.

Basic Series 101 and 106 Testers have a sensitivity of about 10 ohms/volt at low voltages to about 100 ohms/volt at high voltages. Basic Series 108 (DC) Testers have a sensitivity in the range of 100 to 1000 ohms/volt. For applications requiring higher sensitivities, these units are available with an optional sensitive arc detection feature and/or an optional sensitive leakage detection feature. Basic sensitivity of these features is about 25,000 ohms/volt. The sensitive arc detection feature (Option F) is recommended for high sensitivity testing of equipment utilizing inorganic materials, while the sensitive leakage detector feature (Option M) is generally best for organic insulation materials. This is because faults over or through inorganic materials are generally high impedance arcs, with insufficient current flow to trip the standard rejection circuits. Since minute tracking occurs with organic materials even at low current, faults are more easily detected.

These units are recommended for the testing of components and simple assemblies such as switches, terminal boards, thermostats, heaters, wiring harness, etc. They are also used extensively at pre-check stations for more complex parts and assemblies. Generally speaking, Series 101 units are used in pre-check stations, while Series 106 and Series 108 units are used at regular inspection stations.

SERIES 122 - 125 - 122/125 LEAKAGE AND BREAKDOWN TESTERS

The Series 122, 125 and 122/125 family includes an AC Tester, a DC Tester and a combination AC/DC unit. This family is intended primarily for laboratory and field service, where portability and high sensitivity are of prime importance.

Testing voltage is continuously variable and monitored by a built-in voltmeter. Actual leakage is indicated by a dual range microammeter. This series also incorporates sensitive arc detection circuitry. However, it does not incorporate presettable go-no/go visual and audible signals and hence, is not recommended for high production testing.

The Series 122 is available in AC test voltage ratings to 2500 volts RMS. Series 125 is available in DC ratings to 2500 volts. The Series 122/125 provides AC or DC test voltages and is available in ratings to 2500 volts.

Basic sensitivity to breakdowns is 50,000 ohms/volt and useable leakage sensitivity is 200,000 ohms/volt. All AC and AC/DC units incorporate our unique capacity compensation feature which provides a high degree of precision on all AC leakage tests.

These Testers are recommended for major components such as motors, transformers, solenoids, relays, all types of complete assemblies, as well as for critical small components such as diodes, capacitors, tubes, transistors, etc.

SERIES 103 - 105 - 103/105 LEAKAGE AND BREAKDOWN TESTERS

The Series 103, 105 and 103/105 family also includes an AC tester, a DC tester and a combination AC/DC unit. It is essentially the same as the 122 - 125 - 122/125 series except it incorporates a more rugged, iess sensitive leakage milliammeter which is fitted with a pre-settable limit pointer used to actuate go/no-go visual and audible signals and to provide auxiliary external acceptance and rejection signals when desired. This family is intended primarily for production line service, where high production rates and adaptability to automated test installations are essential.

The Series 103 is available in testing voltage ratings to 10 KV RMS AC. The Series 105 is available in ratings to 10 KV DC. The Series 103/105 provides AC or DC test voltages in ratings to 10 KV. Breakdown sensitivity is 50,000 ohms/volt and useable leakage sensitivity is 4,000 ohms/volt. When ordered with standard Option J, leakage sensitivity is the same as for the 122 - 125 - 122/125 series, i.e., 200,000 ohms/volt.

SERIES 103-MP - 105-MP - 103/105-MP LEAKAGE AND BREAKDOWN TESTERS

The MP series family is a fully automatic version of the 103 - 105 - 103/105 series. It provides a controlled rate-of-rise in the application of the test voltage and a pre-settable dwell time. Removal of test voltage can be instantaneous or at a controlled rate-of-fall as desired.

This family is available in the same ratings as the 103 - 105 - 103/105 series and is intended for both production and laboratory applications in testing critical parts and assemblies.

AC vs DC TESTING AND MEGOHM TESTING

We recommend that insulation testing be made with an AC tester whenever possible. This is because the reversal of stress in the insulation will often detect weaknesses that go unnoticed in a DC test. However, there are cases in which DC testing is necessary and we offer the various DC testers listed above to handle these applications. Unless extensive DC testing is expected, the purchase of any straight DC unit is hardly justified in the average plant. Instead, we recommend the purchase of a universal AC/DC unit, such as Series 122/125 - 103/105 or 103/105-MP.

DC and AC/DC combination units may be used in most applications specifying limits on a megohm basis. The proper leakage meter range required may be calculated:

$$\text{Leakage Meter Range in Microamps} = \frac{20 \times \text{DC Test Voltage Specified}}{\text{Megohms Limit Specified}}$$

If a great deal of testing to megohm limits is required, the use of a regular megohmmeter is desirable. For this purpose we offer the Series 225, intended primarily for laboratory and field service and the Series 205 Limit Megohmmeter which is intended primarily for production line service where high production rates and adaptability to semi-automatic installations are essential.

VOLT AMPERE RATINGS

All basic units are rated at 50 VA. This is adequate for practically all applications involving components and assemblies up to 5 HP rating. All Series units are available in higher VA capacities where needed. The most popular higher capacity is 500 VA and is available as our standard Option "U". In case of doubt, the inherent capacity to ground of the item to be tested should be determined and the required VA capacity calculated thus:

$$\text{VA rating required} = 400 \times \text{Capacity in MFD} \times (\text{KV})^2$$

For a rough approximation, a figure of .001 MFD per horsepower for motors, generators, transformers, etc. can be used, and a figure of .000020 MFD (20 PF) per foot can be used for ordinary hook-up wire.

METER ACCURACIES

Meter movements utilized are conventional moving coil types of basic 2% DC accuracy. In high sensitivity applications, taut-band suspension styles are used. For AC metering, silicon diode bridges are used and factory calibration against standards traceable to the NBS is to better than ±3%. No wave form distortion exists in these units and hence, RMS calibrations are guaranteed to be within ±5%. DC calibrations are guaranteed to be within ±2%.

SAFETY INTERLOCKS

All units may be safety interlocked with series manual or automatic safety switches, relays, etc. as desired. In the simpler units, this is done by inserting such interlocks in the AC supply line ahead of the tester. In the more complex units adapter plugs, terminal strips, etc. are provided for this purpose. In addition, all units except Series 101 are optionally available with Zero-Start Interlock, which requires the operator to always return the voltage control to zero volts before turning the unit on. This is designated Option "D" on data sheets and price lists.

OPTIONAL FEATURES

Experience has shown that various specific applications require certain special features. Since these features are not universally required, they are listed as standard optional features on the data sheets and price lists. Specifically, these include such items as EIA rack and panel mounting, automatic dwell timing, multiple range meters, automatic reset after rejection, automatic capacity compensation control, etc.

SPECIAL FEATURES

Since it is not practical to provide standard optional features covering all possible requirements, all other features are considered as special. In many cases, however, little if any extra charges are involved and since engineering has been previously completed, little delivery delay is involved.

Typical examples of such special features generally available for quick delivery are: non-standard Meter Dials and flush mounting units, with ½" mounting flange all around.

In such cases, contact us regarding your requirements and we will gladly forward our suggestions and recommendations.

SPECIAL PURPOSE UNITS

From these basic general purpose units, many special purpose units have evolved to handle specific testing problems. Typical of these are units for Magnet Wire testing. Series 303 - 305 - 306 - 308 and Jacketed Wire testing Series 654 - 656. Many others are available . . . . contact the factory for suggestions.

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INTRODUCTION

These instructions cover Series 103, 105, 103/105, 122, 125 and 122/125 High Voltage Leakage Testers, including all standard optional features. Though all information provided here may not apply to the unit you have, it has not been deleted because it may be of assistance as general back-ground information.

DESCRIPTION

These units are general purpose portable high voltage leakage and breakdown testers. Series 122 units provide AC test voltage; Series 105 and 125 units provide DC test voltage; and Series 103/105 and 122/125 units provide either AC or DC test voltage.

The test voltage is continuously variable and may be set precisely to the value desired. A voltmeter is provided which monitors actual test voltage at all times. A leakage meter is provided which permits accurate determination of current flow into the part under test.

AC and AC/DC units incorporate capacitive compensation circuits to permit cancellation of most of the capacitive charging current on AC tests.

Series 103, 105, 103/105 units are identical with Series 122, 125, 122/125 units with the exception that the leakage meter is fitted with a contact pointer which may be preset as desired to operate an internal rejection signal when the leakage exceeds the permissible limit, or when breakdown occurs. This Series is especially useful for high production testing on a go/no-go basis.

PRINCIPLE OF OPERATION

Basically, these units apply a known voltage to the device under test and measure the current drawn as a criteria of quality.

In an AC test, the load current often includes appreciable capacitive current. When this occurs, the compensation control may be utilized to cancel out the major portion of this capacitive current so that the meter will then read essentially only the resistive component of the load current. When this is done, rejections will be made only on the basis of excessive net resistive current and not on the basis of excessive total current.

Since the capacitive current in a DC test is transient, compensation is not needed when testing with DC.

APPLICATION

Applications of these units are in the testing of all types of electrical/electronic components and assemblies for insulation defects, including leakage dielectric strength, grounds and shorts.

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CONTROLS AND INDICATORS

1. POWER SWITCH

Mounted on the lower left corner of the panel, the toggle power switch controls the application of the high voltage. This is a 3 position switch. Center position is "OFF". When the switch is held down, test voltage is turned on.

The upper, locking position of this switch is normally not connected. However, in units supplied with Option H (Combination Test Leads and Prods) this position is used to turn the voltage on when it is desired to use the test prods instead of the regular test clip leads.

In standard units, the tester will remain on as long as the power switch is held depressed. In units supplied under Option A or B (Automatic Dwell Timing), the power switch is used only to initiate the automatic time cycle. When the preset time cycle is completed, the tester will be turned off. However, if the switch is held in the 'start' position, this will over-ride the timer and the unit will remain on until the switch is released.

In units supplied under Option D (Zero-Start Interlock), the voltage control MUST be at the zero or extreme counter-clockwise position for the power switch to be effective in turning the unit on.

2. POWER LAMP

Mounted adjacent to the power switch, the power lamp always indicates when the test voltage is ON.

3. VOLTMETER

Voltmeter, mounted on upper left of the panel indicates the test voltage at the output terminals of the unit at all times. Note that when a short occurs, this indicator will fall to zero, indicating zero voltage at the output. However, the tester may still be ON, producing test voltage which is absorbed by limit resistors within the unit. When this is the case, the power lamp will remain ON.

4. VOLTAGE CONTROL

Mounted near the center of the panel, this knob is used to adjust the testing voltage. To increase the test voltage, rotate clockwise.

5. AC - DC SWITCH

Used only on 103/105 and Series 122/125 units, this switch selects AC or DC testing voltage. Voltage control should be at zero or unit should be OFF before transferring position of this switch.

6. COMPENSATION CONTROL

This knob is used to adjust the amount of internal compensation applied to balance the capacitive charging current in the device under test. To increase compensation, rotate clockwise. In the extreme counter clockwise position, no compensation is applied. In the extreme clockwise position, the internal compensation capacitors are removed from the circuit and terminals provided for external compensation capacitors become active.

Series 105 and 125 units are straight DC testers and hence, do not have this compensation control.

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CONTROLS AND INDICATORS - Cont'd.

7. LEAKAGE METER

This meter, mounted on the upper right of the panel indicates current drawn by the device under test. If no compensation is used, this will be total load current. If compensation is properly adjusted, this will be a net resistive current.

On Series 103, 105, 103/105 units, a small black knob on the lower center of the meter cover adjusts the position of the red limit needle on this meter. When the black indicating needle reaches the setting of the red limit needle, a rejection will be indicated.

CUATION: The red limit needle may become ineffective if set beyond the graduated portion of the meter dial.

8. METER MULTIPLIER SWITCHES

When used, meter multiplier switches are mounted adjacent to the meter they affect. In such cases, the true reading will be the actual meter reading multiplied by the setting of its multiplier switch.

Standard Models 103 and 105 do not incorporate meter multiplier switches. Standard Model 103/105 incorporates a leakage meter multiplier switch only. Standard Models 122, 125 and 122/125 incorporate a push button leakage meter multiplier switch.

Units supplied under Option E (Dual Range Voltmeter) incorporate a two position voltmeter multiplier switch. Series 103 and 105 units supplied under Options J or K (Multiple Range Leakage Meter) incorporate a 3 position (plus OFF) leakage meter multiplier switch. Series 122, 125, 122/125 units supplied under Option G incorporate an additional leakage meter range.

9. ZERO BALANCE

Used only in higher voltage multi-range units, the zero balance control is used to compensate for miscellaneous internal and external stray capacities.

10. ARC DETECTOR

This small speaker is used to detect and signal low energy arcing, too low in intensity to deflect the leakage meter.

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INSTALLATION AND CHECKING

When first received, unpack this unit carefully and examine for evidence of hidden damage. Keep the carton and file claim with carrier if any damage is evident.

To check the unit quickly, adjust compensation control to NONE and plug the unit into 115 volt, 60 cycle power. With the test leads removed from their connectors, turn unit on and raise voltage to approximately 60% of full scale. On AC units, and on AC/DC units set for AC operation, a slight residual reading may appear on the leakage meter. This should be no more than 3% of the full scale of the meter. On DC this should be less than 1%. (Adjustment of the zero balance - if any - may be required to obtain these minimums).

Insert the test leads into their bayonet connectors. Keep these leads separated and avoid contact with the clips. Turn unit on and raise voltage to value indicated in chart below. Turn unit off, leaving voltage control set. Now short circuit the test leads and again turn the unit on. Leakage meter should rise to value indicated within ± 10%.

VOLTAGE RATING	2500	5000	10,000	
VOLTAGE SETTING	1000	2000	4000	
A.C. S/C MILLIAMPS	3.8	3.7	3.7	
D.C. S/C MILLIAMPS	2.4	1.5	1.6	

This procedure cannot be used with Option D (Zero-Start Interlock) units. Instead, short circuit leads and raise voltage control to obtain the indicated current. Note position of voltage control knob. Turn unit off, remove short circuit, and turn on again, bringing voltage control knob to same position. Voltmeter reading should correspond to the indicated value within ± 10%.

To check reject circuit on Series 103, 105, 103/105 units, hold switch ON and adjust red limit pointer on leakage meter until it contacts the black indicator needle. Buzzer will sound, indicating rejection.

If the unit does not operate according to the above specifications, remove rear panel or top cover and check for evidences of damage. If the difficulty is not readily apparent, do not attempt further work which might void warranty. Contact factory for instructions.

No special installation precautions are necessary. Avoid locations with extremes of temperature, humidity or vibration. As matter of safety, avoid metal topped benches and metal operator stools.

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TECHNICAL NOTES

The following notes may be helpful in specifying use, set-up and operation of this unit.

1. DC Leakage is a direct measure of the DC insulation quality, It may be expressed in terms of insulation resistance as follows:

$$\text{DC Insulation Resistance in Megohms} = \frac{\text{Test Voltage}}{\text{Microamperes Leakage}}$$

2. AC Leakage readings may be utilized to establish other useful information regarding insulation under test. The AC leakage reading with compensation control properly adjusted is essentially a pure resistive current, which may be used to establish the AC insulation resistance as follows:

$$\text{AC Insulation Resistance in Megohms} = \frac{\text{AC Test Voltage}}{\text{Microamps, Compensated}}$$

Approximate insulation power factor may also be established by taking another reading with compensation set to NONE, then:

$$\text{Approximate Insulation P.F.} = \frac{\text{Microamps with Compensation}}{\text{Microamps with no Compensation}}$$

The approximate inherent capacity of the unit under test may also be established by determining the compensation capacity required for minimum microammeter reading, then:

$$\text{Inherent Capacity in MFD} = \frac{\text{Compensation Capacity in MFD}}{\text{Compensation Ratio}}$$

3. For high precision tests, the use of an external capacitor decade is recommended. This should be connected to the blue terminals provided and the compensation selector set to EXT. The external decade is then adjusted in the same manner as described above. Calculations are made in the same manner, using the decade readings as compensation capacity values. Unless the external decade is rated for more than 600 volts, do not use test voltage settings above 1000 volts.

4. When using the tester in go-no/go production inspection service, the capacity compensation may be adjusted on the first unit of a given production item and need not be readjusted. With Series 103, 105, 103/105 units, the high limit pointer may also be preset to specification. With this setting, the buzzer will sound under conditions of excessive leakage and/or complete breakdown. Any arcing, even so low that the leakage meter will not deflect, will cause "static" in the loud speaker..

5. Length and arrangement of test leads is very important on low range AC tests. Leads should be as short as possible and arranged for minimum stray residual meter reading. Residual reading may often be further reduced by reversing line plug and/or by grounding tester cabinet.

These residual effects, plus basic physical differences in insulation materials make absolute correlation between DC and AC tests impossible. AC insulation resistance will generally run considerably below the DC values.

6. Multi-range units incorporate a very sensitive leakage meter. When not in service, it is desirable to set the multiplier switch "OFF". When carrying or shipping the unit, set meter multiplier switch "OFF" and set red limit pointer to zero.

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TECHNICAL NOTES - Cont'd.

7. These units incorporate internal current limiting circuits to reduce damage on breakdowns and for greater operator safety. Since the short circuit current varies with the voltage setting, care must be taken to see that the high limit leakage meter setting is not above the short-circuit current of the tester. See set-up, Note 6.

8. For safety reasons and to avoid possible tester damage in case of a complete product breakdown, the product under test should not be grounded nor should it be connected in any way to the AC power lines.

If the product must be grounded, the low side or metering side must be used. Under no circumstances should the high side be grounded. On units with sensitive leakage ranges, capacitance may be required at the external compensation terminal to cancel internal leakage reading resulting from grounding of the low side. It may also be necessary to readjust the internal residual variable capacitor for a null or cancellation of internal leakage. Under this condition, the internal capacity decade is not usable and an external decade is required.

9. For some applications, it is necessary that the power switch have a locking "ON" position. This can be accomplished by connecting the lower switch terminals to the upper terminals. DO NOT cross over from one side of the switch to the other, but jumper top and bottom contacts that are in a vertical line. The upper position of the power switch will then be a locking "ON" position.

CAUTION: When this connection is made, test leads will be "HOT" at all times that the power switch is in the locking "ON" position.

10. If an external interlock switch is desired as a safety feature, this can be connected in Series with the primary line cord. Alternatively, in Series 103, 105, and 103/105 units, terminals are located inside the tester and must be strapped if no interlock switch is used.

11. Series 103, 105 and 103/105 units may be used to operate external signals such as lamps, bells, buzzers, counters, etc. These should be connected between terminals #18 and #19 on the High Voltage chassis. A reject signal of 115 volts appears between these terminals.

If desired, automatic reset of the reject signals can be provided by the substitution of timing relay #103050 for the dummy plug which is normally installed in these units.

This plug is located on the High Voltage chassis. When automatic reset is provided, the reject signals are automatically extinguished and high voltage removed from the test leads on failure. After approximately 2 seconds, the voltage is again applied to the test leads if the power switch has not been released. The unit will then cycle between reject and off until the power switch is restored or the leakage is reduced below the limit setting.

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PRODUCTION TEST SET-UPS

Exact set-up details will vary with the test procedure utilized. In some procedures, test voltage is pre-set to a fixed value and requires no operator attention. In other procedures, gradual application and removal of test voltage is required and voltage cannot be pre-set. (If high production rates are contemplated, requiring gradual application and/or removal of voltage, our - MP Series Units are recommended.)

The same comments apply to capacity compensation. With a consistent production, the capacity compensation may be pre-set and will require no operator attention. If the product varies or several products are involved, readjustment of the compensation as part of the test procedure may be required.

The following notes cover typical set-up procedure for routine production testing:

1. Using a known good sample of the product to be tested, arrange tester, leads and the product in the mechanical layout to be used, but do not connect leads to the product.

2. Check tester, using procedure under INSTALLATION and CHECKING SECTION.

3. Connect tester to the product to be tested and set capacity compensation to NONE.

4. Turn tester on and raise voltage to required test value. Total leakage current will appear on the leakage meter. (If meter goes off scale, reduce voltage to get a reading of about 80% full scale.) Note this value. Turn tester off.

5. Disconnect one test lead only from the product but leave it as nearly as possible in the same mechanical layout as will be utilized. Turn tester on and using the same voltage as in 4 above, note residual reading on leakage meter. This residual reading is due to distributed capacities and leakages of the layout and should be kept as low as possible. Generally, if the residual reading is less than 10% of the full reading obtained in 4, results will be satisfactory. If this reading is too high, rearrangement of the layout, etc. will be required - see TECHNICAL NOTES, note 5.

   If the unit is equipped with zero-balance control, adjust as necessary to reduce residual to minimum.

6. Reconnect the test lead which was disconnected in 5 above. Again turn the tester on and adjust test voltage to the same value as used in 5. Rotate compensation switch and adjust zero balance control (if any) for minimum leakage meter reading. With typical products, this minimum reading will be in the range of .05 to 1.0 milliamperes per 1000 volts, corresponding to an AC insulation resistance in the range of 1 to 20 megohms). If necessary, readjust the test voltage to the actual that will be used in testing. Note the leakage meter reading which can be considered the nominal for the product.

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PRODUCTION TEST SET-UPS - Cont'd.

Typically, allowable limits will run between 10% and 50% above the nominal established above. However, the limit selected must not be more than 90% of the short circuit capacity of the tester at this particular voltage setting.

To verify, leave voltage control set, short circuit tester leads and turn the unit on. Leakage meter reading will be the actual short circuit capacity of the unit at this particular voltage control setting.

7. After the establishment of test voltage setting, compensation control setting and allowable leakage reading, the unit is ready for production testing.

   In the case of Series 103, 105, 103/105 equipment, the red limit pointer on the leakage meter should, of course, be set to the allowable limit so that the internal go-no/go rejection circuits will function.

   Operation of these rejection circuits should be checked periodically by short circuiting the test leads and turning the unit on. Leakage needle will rise, hit the red pointer and register rejection. Voltage will be cut off, as indicated by red power lamp, as soon as rejection occurs.

8. The procedure for set-up on DC testing is exactly as outlined above, except that the compensation control, if any, remains at NONE.

TEST PROCEDURES

Production Test Procedures, after the above set-up has been made, are quite simple:

1. Attach test lead clips to terminals to be tested.

2. Depress power switch and raise voltage to specified value. Hold the switch on for the duration of test required.*

3. Leakage will be indicated on the leakage meter. If excessive, the part should be rejected. In the case of Series 103, 105, 103/105 units, rejection will be indicated by a buzzer signal which will sound until the switch is released.

   Minute arcs which are too small to deflect the leakage meter will be indicated by static in the arc detection speaker.

* NOTE:
In units supplied under Options A and B (Automatic Dwell Timing), timing of test duration is automatic. The switch should be actuated only momentarily and the unit will then automatically cycle for the duration of test that has been set up on the timer. In units supplied under Option D (Zero-Start Interlock) the voltage control MUST be at the zero or extreme counter-clockwise position for the power switch to be effective in turning the unit on.

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MAINTENANCE AND REPAIR

Routine maintenance of this unit should include:

1. Cleaning dust and dirt from interior as required. Use a soft brush, or low pressure dry air.

2. Inspection of voltage control transformer brush every 3 to 12 months depending on severity of service.

3. Checking of meter calibration every 6 months. Check against standard meters of at least ½% accuracy.

Some units are self protecting and have no fuse. Others are protected by a fuse. If the fuse blows, it should be replaced by one of the same style and rating. If the fuse blows and the replacement also immediately blows, something is wrong with the tester and it must be repaired before proceeding. If the replacement holds, the original fuse failure was probably due to an extreme line voltage surge or normal aging of the fuse. Replacement fuses are available from any radio supply house.

Repair of these testers in the field is not recommended. Testers sent in for repair will normally be repaired and returned within 24 hours. However, if field servicing must be done, follow the procedures suggested in the following paragraphs. Most replacement parts are available from radio supply houses. If replacement parts are to be ordered from the factory, be sure to include a reasonable description of the unit, and the parts required.

If in-plant servicing must be done, the diagrams should first be carefully studied. The area of trouble should then be localized between the control circuits and the high voltage circuits. To do this easily, simply disable the high voltage circuits by lifting the high voltage transformer primary lead wire at the variable transformer.

If an AC voltmeter is then connected to the output terminals of the variable transformer, a voltage of 0 to 130 volts should appear if the unit is on and the voltage control is rotated clockwise.

To check the rejection circuit in Series 103, 105, 103/105 units, momentarily short circuit the two upper terminals on the rear of the limit style leakage meter. When these terminals are shorted, the unit should register rejection.

Troubles in the control circuitry will generally be due to defective plug-in relays, switch contacts or limit circuit diodes. Diodes should show at least 200,000 ohms reverse resistance and less than 200 ohms forward resistance when checked on typical multi-testers.

If the control circuitry check OK, the trouble must be in the high voltage circuits and can generally be traced to open limiting resistors, shorted filtering capacitors or a defective high voltage transformer. Use great care in working on this section, as the voltages are lethal and capacitors can hold a charge even when the unit is "OFF".

Trouble-shooting of metering circuits is covered in Section on calibration.

SLAUGHTER Company
MOORE & HAILEY STREETS
ARDMORE, OKLAHOMA
73401
TELEPHONE: 405-223-4773 P. O. BOX 1805 TWX: 910-830-6972

EFFECTIVE DATE -- 2-1-69 A

PRICE LIST
SERVICE & REPAIR PARTS

FOR SERVICE & REPAIR OF STROBOSCOPES, SEE PL-15

PARTS & SERVICES LISTED HERE ARE ONLY THOSE MOST COMMONLY REQUESTED. REPLACEMENT PARTS FOR ALL OF OUR EQUIPMENT ARE AVAILABLE, GENERALLY FROM FACTORY STOCK. FOR PARTS NOT LISTED CONTACT FACTORY GIVING DESCRIPTION OF ITEM PLUS MODEL AND SERIAL NUMBERS OF UNIT INVOLVED. THESE NUMBERS ARE LOCATED ON THE FRONT PANEL OR ON THE UNDERSIDE OF THE CABINET.

RE-CALIBRATION, REPAIR & OVERHAUL SERVICE

PRICES LISTED BELOW COVER LABOR CHARGES ONLY. REPLACEMENT PARTS COSTS WILL BE ADDITIONAL, WITH PROPER CREDIT ALLOWED FOR SALVAGE VALUE OF OLD PARTS. MINOR REPAIRS ARE BILLED ON A TIME & MATERIAL BASIS, WITH A $5.00 MINIMUM INSPECTION CHARGE IN ALL CASES.

SERIES 101	OVERHAUL & ADJUST	10.00
SERIES 106	OVERHAUL, ADJUST & CALIBRATE	25.00
SERIES 103	OVERHAUL, ADJUST & CALIBRATE	45.00
SERIES 105	OVERHAUL, ADJUST & CALIBRATE	50.00
SERIES 103/105	OVERHAUL, ADJUST & CALIBRATE	75.00
SERIES 103-MP	OVERHAUL, ADJUST & CALIBRATE	70.00
SERIES 105-MP	OVERHAUL, ADJUST & CALIBRATE	75.00
SERIES 103/105-MP	OVERHAUL, ADJUST & CALIBRATE	95.00
SERIES 122	OVERHAUL, ADJUST & CALIBRATE	37.50
SERIES 125	OVERHAUL, ADJUST & CALIBRATE	40.00
SERIES 122/125	OVERHAUL, ADJUST & CALIBRATE	60.00

PRODS, LEADS, FITTINGS, LINE CORDS, ETC.

NO. 102-022	RETRACTING SAFETY PRODS WITH 4' LEADS & BAYONET CONNECTORS--PAIR-	15.00
NO. 102-023	RETRACTING SAFETY PRODS, ONLY --PAIR-	12.00
NO. 102-024	LEADS ONLY, 4' FOR ABOVE, COMPLETE WITH BAYONET CONNECTORS--PAIR-	3.00
NO. 102-025	CLIP LEADS, 4', 6' OR 8' COMPLETE WITH BAYONET CONNECTORS--PAIR-	6.00
NO. 150-008	SWIVEL TERMINAL	.25
NO. 102-026	SOCKETS, BAYONET STYLE, TO MATE ABOVE LEAD CONNECTORS -----PAIR-	1.90
NO. 102-027	CONNECTORS, BAYONET STYLE, TO MATE ABOVE SOCKETS ----------PAIR-	1.25
NO. 102-010	LEAD WIRE, BULK LENGTHS ----------PER FOOT-	.15
NO. 125-000	2 CONDUCTOR LINE CORD SET	.65
NO. 125-013	3 CONDUCTOR LINE CORD SET	1.25
NO. 150-068	BLANK 11 PIN ADAPTER PLUG	.50

BULBS, INDICATOR JEWELS, FUSES

NO. 350-004	TYPE NE-51 BULB	.40
NO. 350-005	TYPE 47 BULB	.30
NO. 350-029	TYPE 1815 BULB	.40
NO. 350-003	TYPE 6S6 BULB	.44
ALL FUSES	----------SPECIFY RATING----------BOX OF 5----------	1.17
ALL 1" JEWELS	--------SPECIFY COLOR----------	.84
ALL ½" JEWELS	--------SPECIFY COLOR----------	.38

BUZZERS & SPEAKERS

NO. 375-031	6 VOLT BUZZER	3.65
NO. 375-000	115 VOLT BUZZER	2.95
NO. 375-004	1½" SPEAKER	3.00
NO. 375-001	3" SPEAKER	3.25
NO. 375-001L	4" SPEAKER	3.75
NO. 375-005	4" BELL	13.75

RECTIFIERS

NO. 575-026	SILICON DIODE, 1000 V, UNIVERSAL REPLACEMENT	1.40

NOTE: THIS PART MAY BE USED TO REPLACE ANY PIGTAIL TYPE POWER OR METERING SILICON DIODE. COPPER OXIDE RECTIFIERS IN EARLY UNITS SHOULD BE REPLACED WITH A BRIDGE OF 4 OF THESE DIODES.

HIGH VOLTAGE TRANSFORMERS

NOTE: A SALVAGE CREDIT OF 50% WILL BE ALLOWED ON THE PURCHASE OF ANY OF THESE IF YOUR OLD TRANSFORMER IS RETURNED, PREPAID.

(STANDARD 50VA RATINGS)

NO. 200-016	FOR ALL SERIES 103 & 106 UNITS IN 2500 V RATINGS	30.00
NO. 200-025	FOR ALL SERIES 101 UNITS IN 2500 V RATINGS	30.00
NO. 200-005	FOR SERIES 106 & SERIES 108 UNITS IN 5000 V RATINGS	40.00
NO. 200-006	FOR SERIES 106 & SERIES 108 UNITS IN 10,000 V RATINGS	70.00
NO. 200-007	FOR ALL OTHER SERIES UNITS IN 5000 V RATINGS	50.00
NO. 200-018	FOR ALL OTHER SERIES UNITS IN 10,000 V RATINGS	200.00

(500 VA OPTION U RATINGS)

NO. 200-024	FOR ALL 2500 V OPTION U SERIES 101 & 106	57.30
NO. 200-022	FOR ALL 2500 & 5000 V OPTION U SERIES 103	177.00

MISCELLANEOUS TRANSFORMERS

NO. 210-000	VARIABLE TRANSFORMER FOR ALL SERIES TESTERS (50VA)	12.50
NO. 240-001	L.V. ISOLATION TRANSFORMER FOR ALL SERIES TESTERS	10.00
NO. 240-000	BUZZER & SPEAKER TRANSFORMER FOR ALL SERIES TESTERS	4.25

SWITCHES

NO. 300-000	SPST POWER SWITCH, SERIES 101 & 106	.75
NO. 300-006	DP3T POWER SWITCH, SERIES 122, 125, 103, 105, ETC.	2.50
NO. 300-009	4P3T POWER SWITCH, ALL TYPE MP UNITS	7.50
NO. 300-003	4P3T CONTROL SWITCH, ALL TYPE MP UNITS	10.00
NO. 310-037	ALL COMPENSATION SWITCHES	7.50
NO. 310-000	SP6T VOLTAGE SELECTOR SWITCH, SERIES 101	6.00
NO. 103-(-)	ALL METER MULTIPLIER SWITCHES ----(SPECIFY UNIT)----------	10.00
NO. 103-(-)	ALL AC/DC SWITCHES ----------(SPECIFY UNIT)----------	15.00
NO. 330-000	PUSH SWITCH, SERIES 122 & 125	3.50

METERS & PARTS

NOTE: A SALVAGE CREDIT OF 50% WILL BE ALLOWED ON THE PURCHASE OF ANY OF THESE METERS IF YOUR OLD METER IS RETURNED, PREPAID.

NO. 250-(-)	ALL VOLTMETERS & MILLIAMMETERS, PLAIN STYLE --(SPECIFY RANGE)-	45.00
NO. 260-(-)	ALL MICROAMMETERS, PLAIN STYLE ----------(SPECIFY RANGE)-	60.00
NO. 270-(-)	ALL VOLTMETERS & MILLIAMMETERS, LIMIT STYLE --(SPECIFY RANGE)-	90.00
NO. 270-(-)	ALL MICROAMMETERS, LIMIT STYLE ----------(SPECIFY RANGE)+	120.00
NO. 250-010	DIAL COVER FOR PLAIN STYLE METERS	1.50
NO. 270-011	DIAL COVER FOR LIMIT STYLE METERS	4.00

RELAYS & TIMERS

NO. 400-(-)	ALL 8 PIN PLUG-IN RELAYS	12.50
NO. 400-(-)	ALL 11 PIN PLUG-IN RELAYS	15.00
NO. 400-(-)	ALL ISOLATION RELAYS	18.52
NO. 103-050	TIMER, 8 PIN PLUG-IN AUTO RESET FOR 103 SERIES	30.00
NO. 400-027	TIMER, 3 MINUTE, FOR ALL MP SERIES	33.75
NO. 400-(-)	ALL FLUSH MOUNT TIMERS	39.75

PRICES INCORRECT CONTACT FACTORY

PRICES INCORRECT CONTACT FACTORY

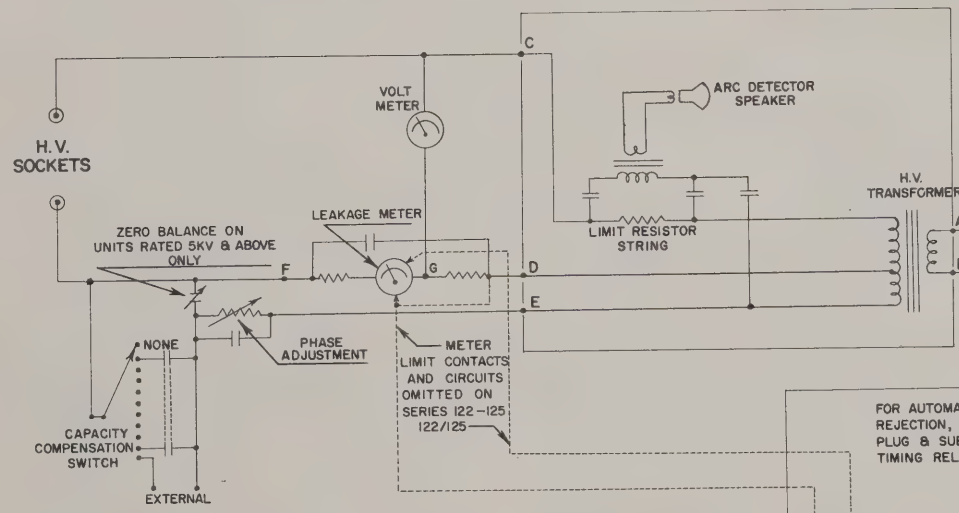
NOTES:

1 FOR DETAILS OF METERING CIRCUITS, SEE DRAWINGS *103210 & *103211.

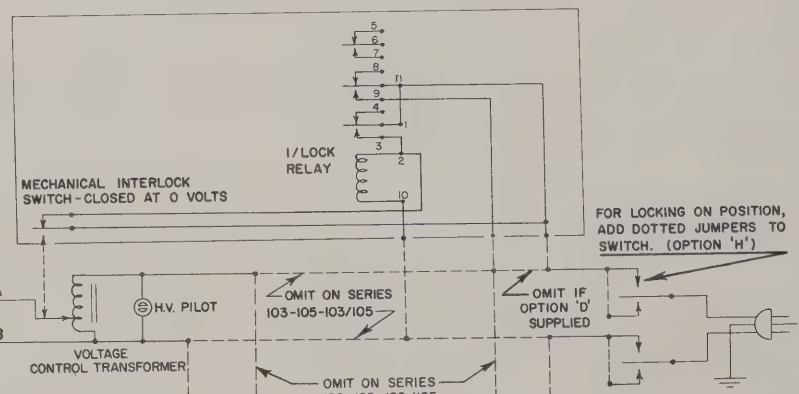
2 FOR OPTIONAL 'A' 'B' (AUTOMATIC DWELL TIMING), SEE DRAWING *103209.

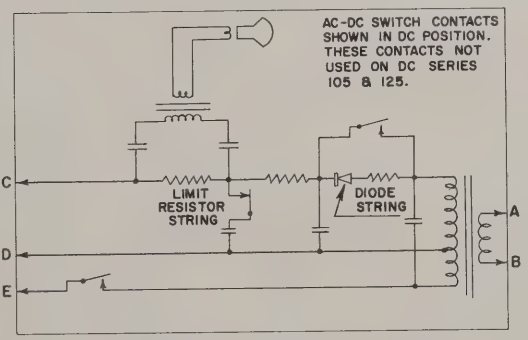
3 THIS DRAWING SIMPLIFIED FOR CLARITY.

AC H.V. SUPPLY CIRCUITS (SERIES 103 & 122)

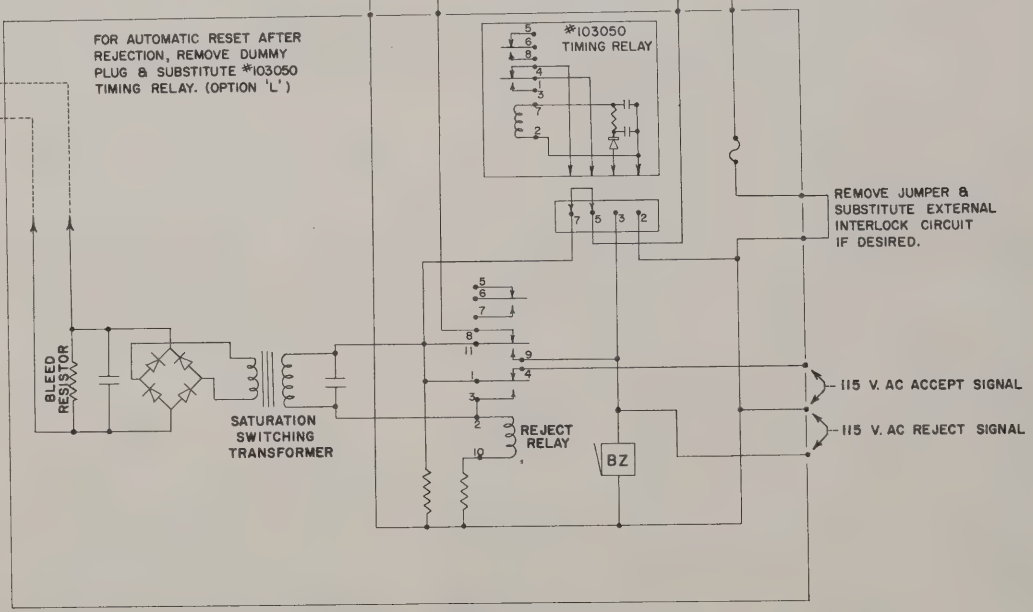


ZERO START INTERLOCK CIRCUIT - OPTION 'D'





DC & AC-DC H.V. SUPPLY CIRCUITS (SERIES 105-103/105-122-122/125)



REJECTION CIRCUITS — SERIES 103-105-103/105

SLAUGHTER Company
P. O. BOX 1693 ZIP 73401
TEL 405 223 4773 ARDMORE, OKLAHOMA

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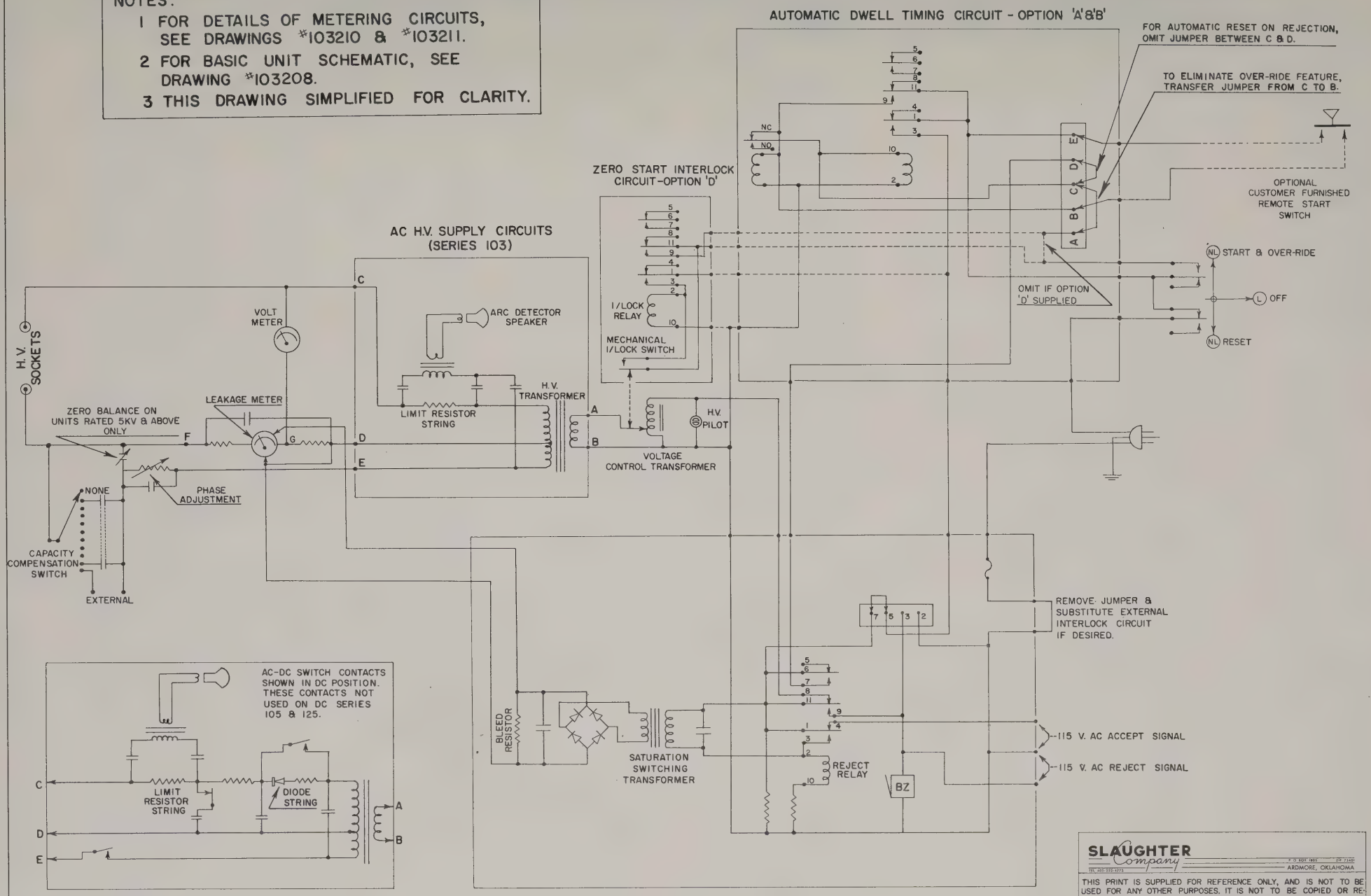
TITLE	ISSUE NO. X
BASIC CIRCUIT Series 103-105-103/105-122-125-122/125	NO. 103208

NOTES:

1 FOR DETAILS OF METERING CIRCUITS, SEE DRAWINGS *103210 & *103211.

2 FOR BASIC UNIT SCHEMATIC, SEE DRAWING *103208.

3 THIS DRAWING SIMPLIFIED FOR CLARITY.



DC & AC-DC H.V. SUPPLY CIRCUITS (SERIES 105-103/105)

REJECTION CIRCUITS — SERIES 103-105-103/105

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TITLE	ISSUE NO.
BASIC CIRCUIT Series 103-105-103/105 With Options A-B-D	X
	NO. 103209

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P. O. BOX 1805 ZIP 73401
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CALIBRATION PROCEDURES

These are precision units, and have been carefully calibrated at the factory. Do not attempt re-calibration unless suitable standards are available. AC current metering circuits incorporate adjustments for linearity as well as range. Careless adjustment can result in a calibration that is accurate only over a limited range, and therefore useless.

When operating above half scale, on all ranges, internal heating may occur in the protective limiting resistors. Operating periods should be limited to 15 seconds maximum with about 1 minute cooling period allowed between cycles.

A. CHECKING CALIBRATION

1. VOLTMETER

Voltmeter calibration should be checked first. For this purpose use a quality voltmeter of at least ½% accuracy, and at least 5000 ohms per volt sensitivity. When checking voltmeter calibration, compensation switch should be set to NONE, and leakage meter range switch should be set to "OFF". Check calibration at four or five points on the scale. At no place should the error exceed 5% of the full scale rating of the voltmeter. Refer to condensed instructions supplied with this manual for hook-up and additional notes.

2. CURRENT METER

CAUTION:
Length and arrangement of leads is very important on low ranges. Leads should be as short as possible, and arranged for minimum stray residual meter reading. For minimum residual, be sure unit is operated from a 3 prong, properly grounded receptacle.

There are 2 methods of checking leakage meter calibration. First, and best, is to use a precision standard ammeter of a suitable range. When using this method, connect the meter in series with the lower output jack, as close to the tester as possible. Load resistors should then be connected between the meter and the upper jack as shown on the condensed instruction chart, so the unit will operate at between 20% and 40% of full rated voltage during the calibration.

If a suitable ammeter is not available, it is possible to shunt a precision voltmeter. Consult your regular instrument handbook for information on this.

The second method, which is more commonly used in the more sensitive AC ranges consists of building up a known load on the unit with precision resistors, and then applying a known voltage, using the calibrated internal voltmeter as a standard. Since voltage is known and load resistance is known, actual current can be calculated, and compared with the actual leakage meter reading. Suggested load values are given in the condensed chart accompanying these instructions.

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B. TROUBLE SHOOTING METER CIRCUITS

If the calibration checks considerably off, some defect may exist which should be repaired before attempting re-calibration. Consult the following notes for suggestions.

1. If the meter is consistently low on all ranges and appears heavily damped on all ranges, a defective meter movement is indicated.

2. If the meter is about 50% low on all AC ranges but damping is satisfactory; even slightly under damped, a defective meter rectifier diode is indicated.

3. If linearity is poor on all AC ranges, a leaky meter rectifier diode is indicated.

4. If at least one range is good on both calibration and linearity, this is a positive indication that meter movement is OK. This also means that the meter rectifier is probably OK, particularly if the good range is the most sensitive AC range.

5. If the meter will not read at all, either an open meter coil or a shorted rectifier bridge is indicated.

6. Early AC units incorporate a copper-oxide meter rectifier, usually inside the meter case. In such units the entire meter should be replaced if the internal rectifier is defective. Current production utilizes an external meter bridge made up of 4 silicon diodes, which can be replaced. To check diodes, disconnect and measure forward VS reverse resistance with a multimeter. Forward resistance should be less than 200 ohms and reverse resistance should be above 2 megohms. If any one diode is defective, all four in the bridge must be replaced.

7. If all ranges are good, except the linearity at the low end of the most sensitive scale, re-check the test set-up to be sure that stray capacities are not causing an excessive residual reading that is giving false results.

8. Some meters utilize an external damping resistor. This is factory matched to the meter and should not be changed. If a new meter is being installed, it may be necessary to change this resistor for optinum damping. The damping resistor should allow a needle over-shoot on the most sensitive range of at least 1% and not more than 3% when checked at about 80% scale reading. Recalibration will be required if this resistor is changed.

9. An internal breakdown between the locking coil and the metering coil of contact meters will result in an excessive residual meter reading even when the test leads are removed from their jacks. To check, disconnect all wiring from meter studs and check with a multimeter. Resistance between all lower studs and all upper studs should be infinite.

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TROUBLE SHOOTING METER CIRCUITS - Cont'd.

10. The small trimmer capacitor marked RESIDUAL ADJUSTMENT is utilized to compensate for external wiring capacity variations. It is adjusted during manufacture of the unit and should not need readjustment thereafter. If this adjustment should be disturbed accidentially, it should be readjusted for minimum residual leakage meter reading with test leads removed and with unit set to its most sensitive range at 80% of maximum voltage.

C. RECALIBRATION PROCEDURES

When recalibrating a unit, be sure to recalibrate the voltmeter first; then proceed to the leakage meter, recalibrating the most sensitive scale first, proceeding to the less sensitive scales until the job is complete.

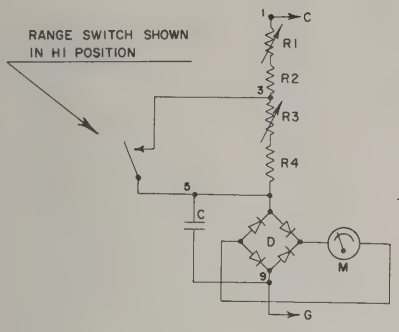
Voltmeter should be recalibrated at between 60% and 80% of full scale as convenient. The trimmers marked CAL should be adjusted as necessary. (Early units do not have trimmers and adjustment is made by substituting precision deposited carbon resistors as necessary).

On multiple range voltmeters, recalibrate lowest range first, proceeding on to the highest range. On AC-DC units, reclaibrate AC scales before the DC.

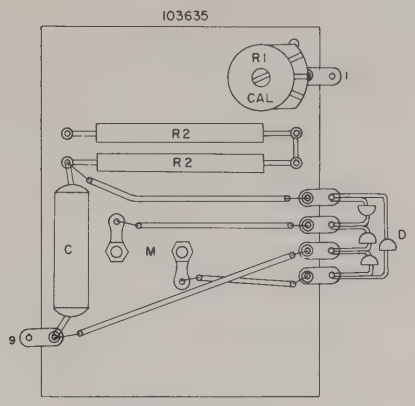
AC leakage meters are recalibrated at two points; approximately 80% of full scale and 20% of full scale. These are two adjustments for each range: A shunt trimmer which adjusts the basic calibration and a series trimmer which adjusts linearity. However, these adjustments are inter-acting and it is therefore, necessary to readjust one after the other in gradually smaller steps until best results are obtained. Generally speaking, best procedure is to adjust the shunt first at the 20% point and then the series at the 80% point. Then return to the shunt at the 20% point and back to the series at the 80% point, repeating as necessary until the job is done.

DC leakage meters incorporate only one adjustment, a shunt trimmer, for each range. It is generally recalibrated at between 60% and 80% of full scale.

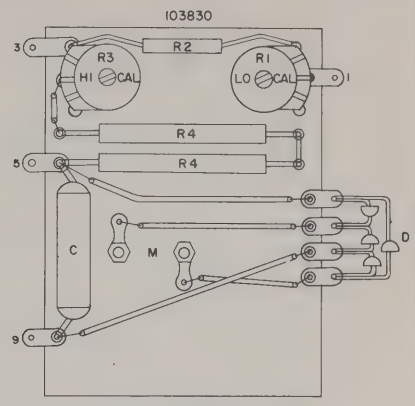
After recalibration, seal all adjustments with glyptal or similar material.



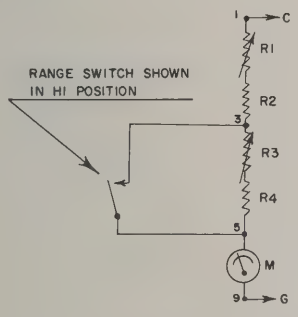
AC VOLTAGE METERING CIRCUIT



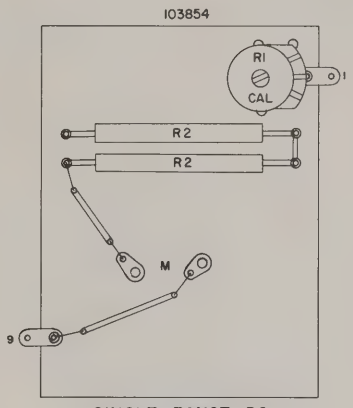
SINGLE RANGE AC
VOLTMETER BOARD



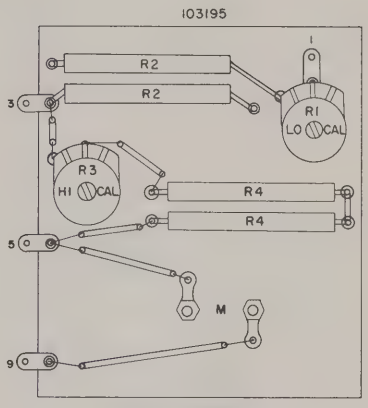
DUAL RANGE AC
VOLTMETER BOARD



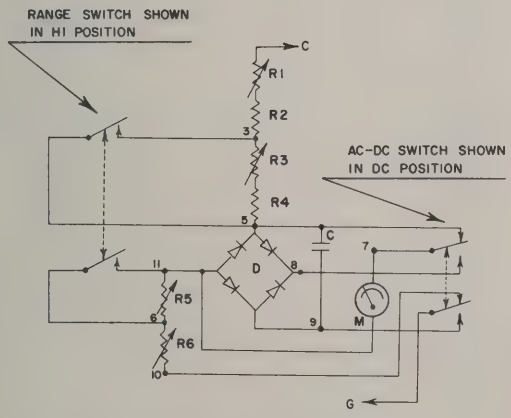
DC VOLTAGE METERING CIRCUIT



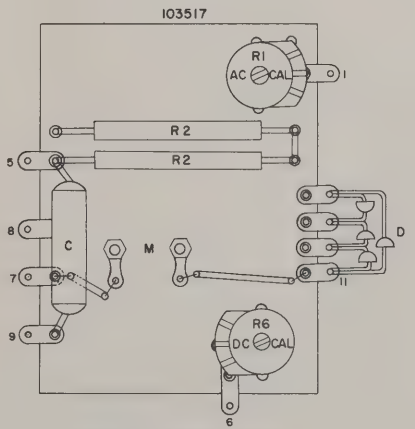
SINGLE RANGE DC
VOLTMETER BOARD



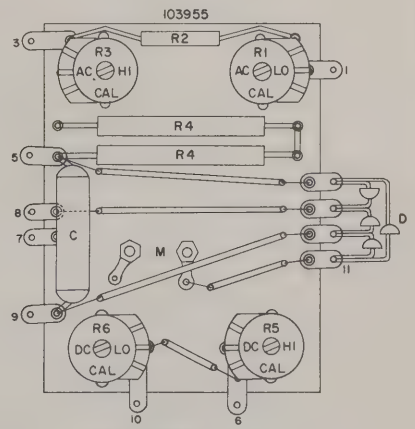
DUAL RANGE DC
VOLTMETER BOARD



AC-DC VOLTAGE METERING CIRCUIT



SINGLE RANGE AC-DC
VOLTMETER BOARD



DUAL RANGE AC-DC
VOLTMETER BOARD

NOTES:

1 BOARDS ARE TYPICAL – DETAILS VARY WITH RATING AND MODEL.
2 ALL DIODES ARE *575026.
3 MOST METER MOVEMENTS ARE 1 MA.
4 FOR INTERCONNECTIONS, SEE BASIC TESTER SCHEMATICS.

SLAUGHTER Company
ARDMORE, OKLAHOMA

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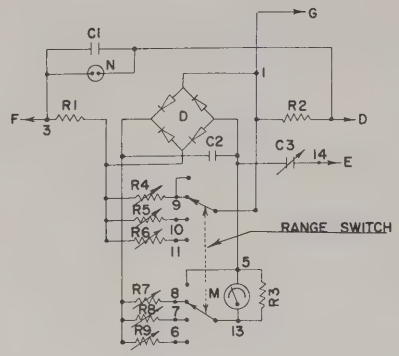
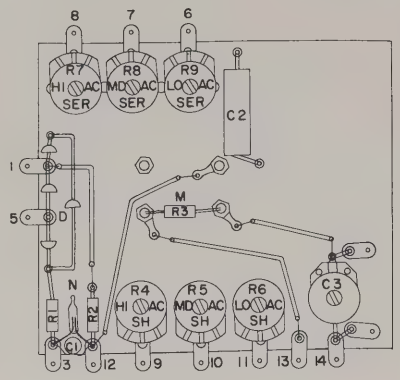
TITLE	ISSUE NO. X
VOLTAGE METERING CIRCUITS	NO. 103210



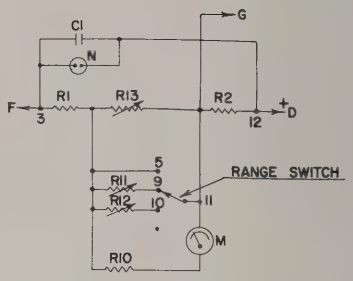
SCHEMATIC



TYPICAL METER BOARD

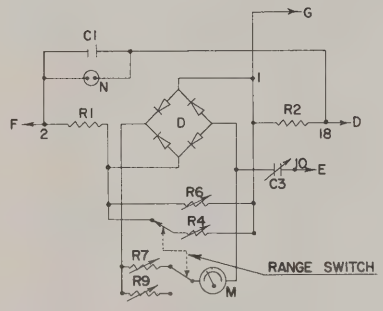
TRIPLE RANGE AC LEAKAGE METERS

103521



SCHEMATIC

TRIPLE RANGE DC



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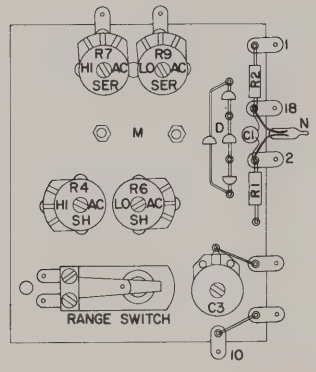
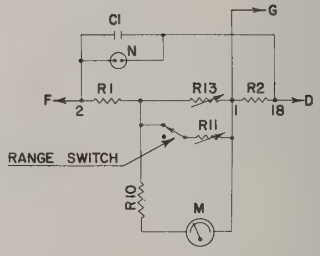


TYPICAL METER BOARD

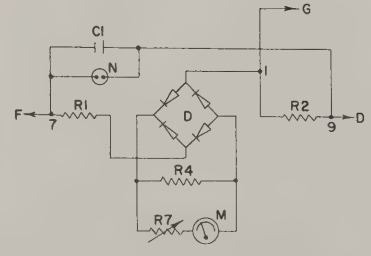
DUAL RANGE AC LEAKAGE METER

122005



SCHEMATIC

DUAL RANGE DC



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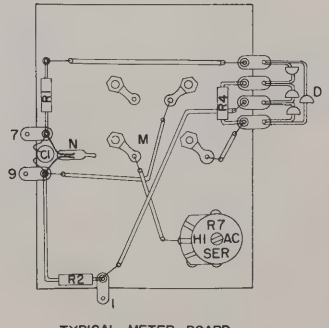
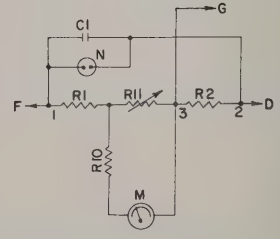


TYPICAL METER BOARD

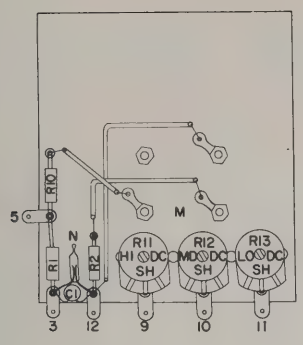
SINGLE RANGE AC LEAKAGE METER

103049



SCHEMATIC

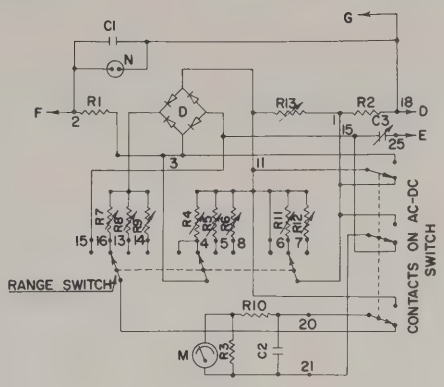
SINGLE RANGE DC



TYPICAL METER BOARD

LEAKAGE METERS

103851



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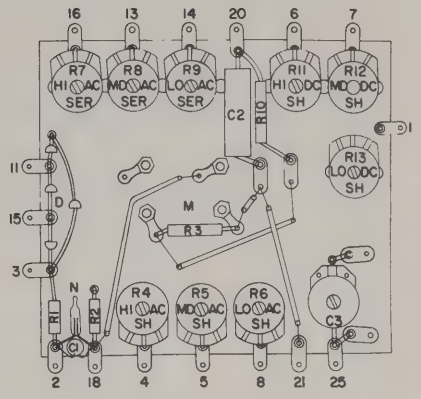
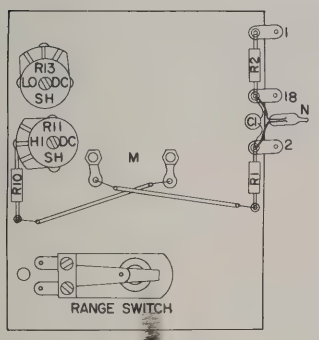


TYPICAL METER BOARD

TRIPLE RANGE AC-DC LEAKAGE METERS

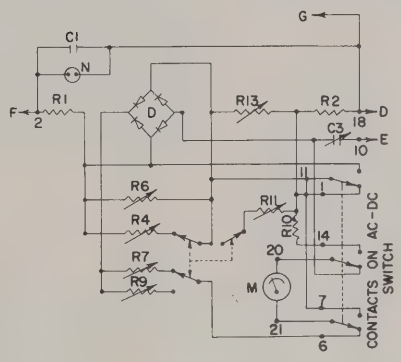
103518



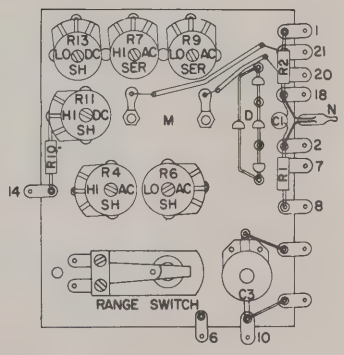
TYPICAL METER BOARD

LEAKAGE METERS

122044



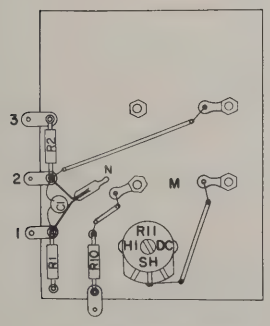
SCHEMATIC



TYPICAL METER BOARD

DUAL RANGE AC-DC LEAKAGE METERS

122024



TYPICAL METER BOARD

LEAKAGE METERS

103859

NOTES:

1. BOARDS SHOWN ARE TYPICAL – DETAILS VARY WITH RATING AND MODEL.
2. ALL DIODES ARE *575026.
3. METER MOVEMENTS ARE 0/20-0/50-0/1000 MICROAMP.
4. FOR INTERCONNECTIONS, SEE BASIC TESTER SCHEMATICS.
5. ALL RANGE SWITCHES SHOWN IN HIGH POSITION.
6. ALL AC-DC SWITCH CONTACTS SHOWN IN AC POSITION.

SLAUGHTER Company

ARDMORE, OKLAHOMA

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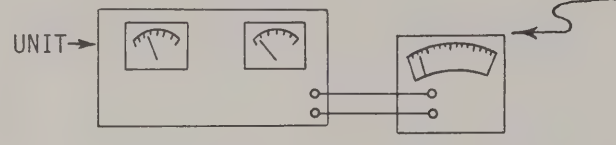
TITLE	ISSUE NO. X
CURRENT METERING CIRCUITS	NO. 103211

SLAUGHTER Company
TEL 405-223-4773
P. O. BOX 1805 ZIP 73401
ARDMORE, OKLAHOMA

CONDENSED CALIBRATION INSTRUCTIONS
SERIES 103-105-103/105-MP-122-125-122/125

A. VOLTMETER CALIBRATION:

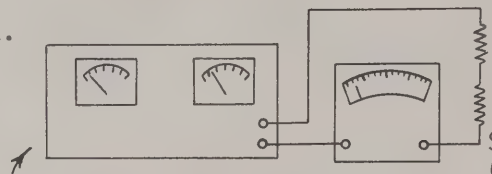


compensation switch "NONE"
multiplier switch "OFF"

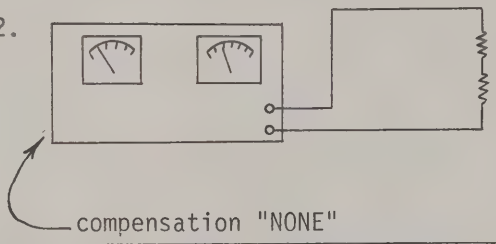
RANGE	POINT	ERROR LIMIT
2500	2000	125 V
5000	4000	250 V
10,000	8000	500 V

B. CURRENT METER CALIBRATION:

METHOD 1.



METHOD 2.



RANGE	VOLTS	LOAD RESISTORS OHMS	LOAD RESISTORS WATTS	CURRENT	ERROR LIMIT
0/100 UA	1000	50M	2	20 UA	5 UA
	1000	20M	2	50 UA	5 UA
AC	800	10M	2	80 UA	5 UA
0/1000 UA	1000	5M	2	200 UA	50 UA
	1000	2M	2	500 UA	50 UA
AC	800	1M	2	800 UA	50 UA
0/5 MA	1000	1M	2	1 MA	.25 MA
AC	900	300K	5	3 MA	.25 MA
	800	200K	10	4 MA	.25 MA
0/100 UA DC	1200	20M	2	60 UA	5 UA
0/500 UA DC	1200	3M	2	400 UA	25 UA
0/1000 UA DC	1200	2M	2	600 UA	50 UA
0/5 MA DC	900	300K	5	3 MA	.25 MA

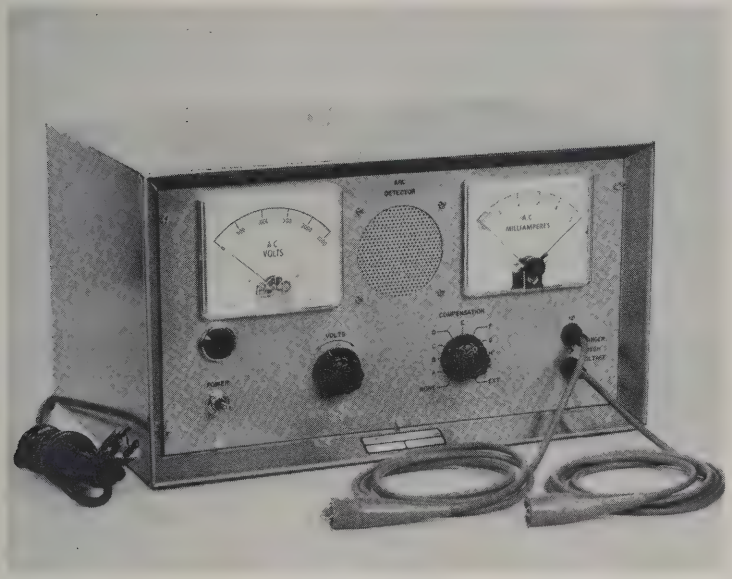
C. NOTES

1. CALIBRATE VOLTMETER FIRST, THEN CURRENT METER, STARTING WITH MOST SENSITIVE RANGES.
2. ON SENSITIVE CURRENT RANGES, BE SURE LAYOUT GIVES MINIMUM RESIDUAL READING.
3. WHEN CALIBRATING CURRENT METER, KEEP COMPENSATION SWITCH AT "NONE".
4. AVOID INTERNAL HEATING EFFECTS BY LIMITING 'ON' PERIODS TO 15 SECONDS.

High-voltage Leakage Tester

audibly signals excess leakage ...grounds .....arcing

SERIES 103, 105 & 103/105



FASTER

Buzzer signal lets you watch what you are doing

BETTER

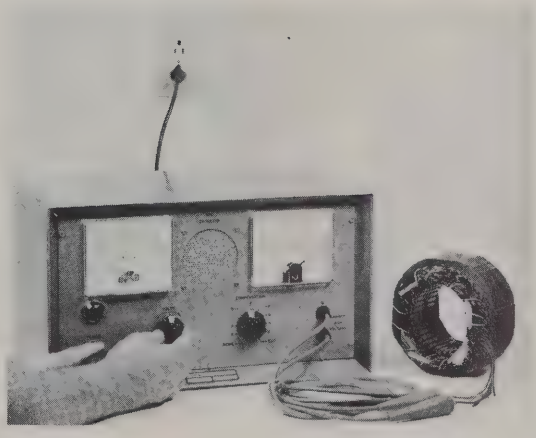
Non-destructive, Limited energy.

ACCURATE

Capacity compensation on a.c. tests

FOR FASTER TESTING

Use these testers for high voltage testing of all types of electrical equipment in the engineering lab and on the production line. Use the Series 103 tester if only AC testing voltage is required, the Series 105 tester if only DC testing voltage is needed, or the Series 103/105 if both AC and DC testing voltages are needed.



DESCRIPTION

Basically, these units apply a known voltage to the insulation under test, and measure the current flow as an indication of insulation quality.

In AC testing, the load current often includes an appreciable capacitive component. When this is true, the compensation control may be used to cancel out the major portion of this capacitive current so that the meter reads essentially only the resistive component. In DC testing, the capacitive current is transient, and compensation is not needed.

AC tests provide data for a complete analysis of the insulation — total leakage, resistive leakage, AC resistance, power-factor, inherent capacity, and dielectric strength. DC tests provide data for insulation resistance in megohms, and dielectric strength.

Here's the details . . .

SLAUGHTER COMPANY — **ARDMORE, OKLAHOMA**

TWX 910-830-6972 — TELEPHONE: 405-223-4773

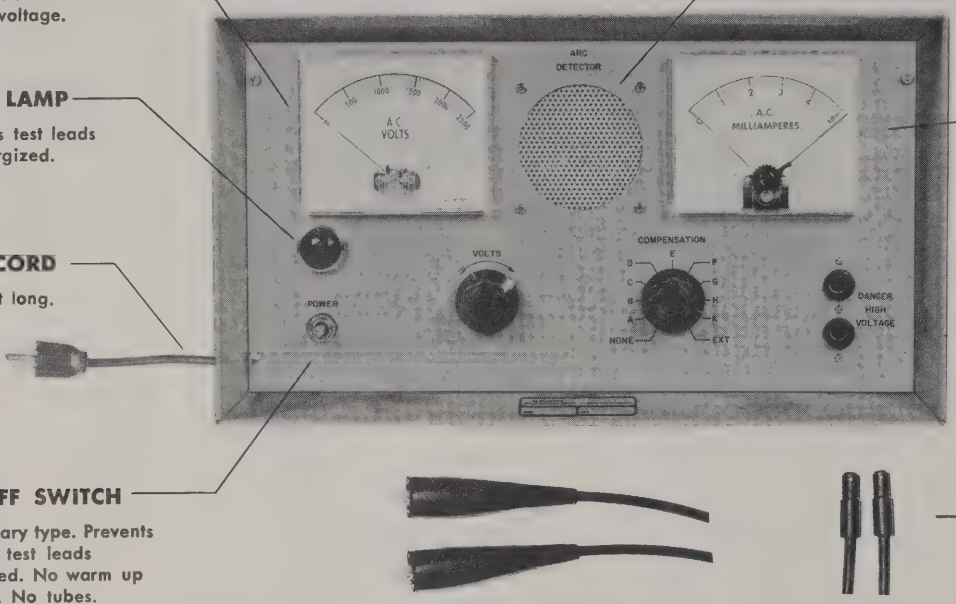
Better production testing – Watch

VOLTMETER
Reads actual testing voltage.

PILOT LAMP
Indicates test leads are energized.

LINE CORD
8½ feet long.

ON-OFF SWITCH
Momentary type. Prevents leaving test leads energized. No warm up needed. No tubes.



SPEAKER
Signals arcing.

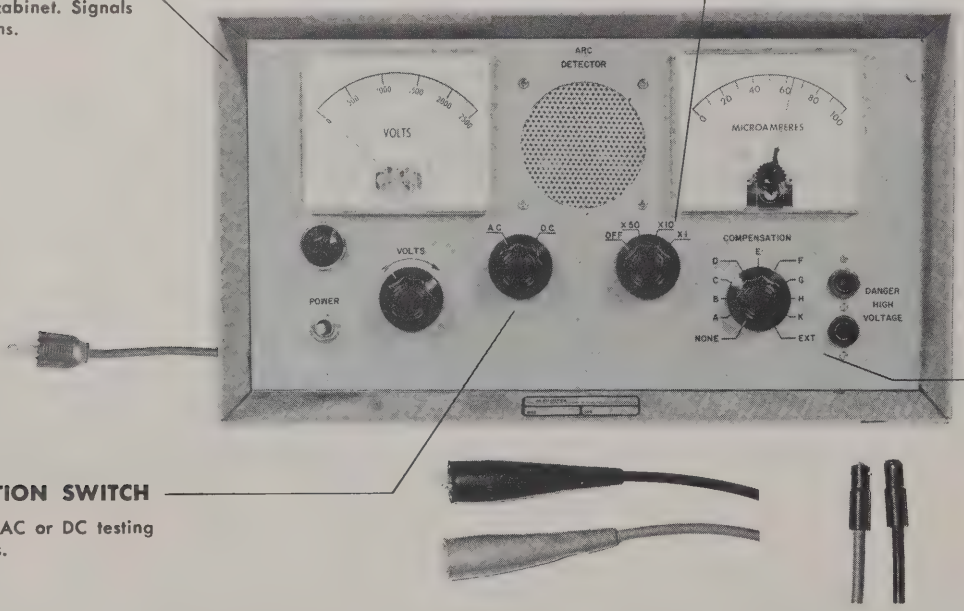
LEAKAGE METER
Adjustable high limit pointer presets rejection limit. Rings buzzer and de-energizes test leads on rejection.

TEST LEADS
8 feet long, detachable.

Shown above is the standard Model 103-2.5. The same construction is used in all Series 103 and Series 105 units in ratings through 5000 volts. However, Series 105 units do not have a compensation control. Illustrated below is typical construction of Series 103/105 units through 5000 volt ratings.

BUZZER
Inside cabinet. Signals rejections.

FUNCTION SWITCH
Selects AC or DC testing voltages.



MULTIPLIER SWITCH
Selects leakage meter ranges.

CAPACITY COMPENSATION
Cancels charging current due to capacity of part on test during AC tests. Terminals provided for external compensative capacitor when needed.

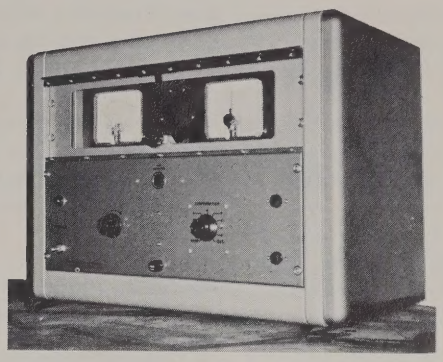
SLAUGHTER COMPANY — ARDMORE, OKLAHOMA

• MANUFACTURERS OF TEST EQUIPMENT FOR PRODUCTION-LINE USE •

our product and hear the test -

HIGHER VOLTAGE RATINGS

In ratings above 5000 volts, the construction shown here is used. The cabinet is larger, and the meters are recessed behind a safety shield of clear plastic. Retracting safety prods which are optionally available (Option H) in ratings through 5000 volts are not available for ratings above 5000 volts.



SPECIFICATIONS—Standard Models

	SERIES 103			SERIES 105			SERIES 103/105		
Rating ..... Volts	2500	5000	10,000	2500	5000	10,000	2500	5000	10,000
Max. Short-Circuit ..... MA	10	10	10	5	5	5	10	10	10
Leakage Meter Range ..... MA	5	5	5	0.5	0.5	0.5	0.1/1/5	0.1/1/5	0.1/1/5
Compensation Range ..... MFD	.005	.002	.001	—	—	—	.005	.002	.001
Useful Megohm Range ..... MEG	0.1/5	0.1/10	0.2/20	1/50	1/100	1/200	0.1/250	0.1/500	0.1/1000
Cabinet ..... wxhxd	17x10x11	22x13x15	24x16x16	17x10x11	22x13x15	24x16x16	17x10x11	22x13x15	24x16x16
Weight ..... Lb.	22	40	65	22	40	65	25	45	75

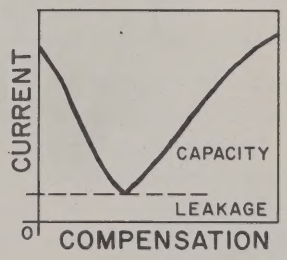
All units are for use on 117 V. 60 cycle power.
Higher short circuit ratings available on special order.
Certain options require increase in cabinet size and weight.
Useful megohm range for Series 103 based on AC resistance testing, others on DC.

CAPACITY COMPENSATION—HOW IT WORKS

The current during an AC high voltage test is due to leakage of the insulation, plus a charging current due to the electrostatic capacity of the device being tested. By inserting a compensating capacitance into the circuit, only the leakage current will remain.

In the Leakage Tester this is done by adjusting the capacity compensation knob to obtain the lowest current reading on the milliammeter, thereby "tuning-out" the capacity current as shown at right.

Adjustable compensation eliminates determining equipment capacity in order to set up a leakage test, and permits testing mixed models on a production line.



SEE NEXT PAGE FOR MODIFICATIONS, STANDARD OPTIONS, PRICES AND ORDERING INFORMATION.

OVER

MODIFICATIONS — Standard Options

AUTOMATIC DWELL TIMING — This modification automatically controls the duration of time that the test voltage is applied. Specify Option "A" if a timing period of between .1 and 6 seconds is required, Option "B" if the period is between 3 seconds and 3 minutes. Timing may be easily pre-set to any period with these ranges.

COMBINATION TEST LEADS — Testers are normally supplied with clip-on type test leads. For some production applications the use of retracting safety prods is preferred, and the combination test lead Option "H" is available. This feature can be ordered with new units, or it can be applied at any time to existing units.

DUAL RANGE VOLTMETER — This is Option "E", and can be provided in any desired combination of ranges within the rating of the unit.

MULTIPLE RANGE LEAKAGE METER — This feature is particularly useful in the testing of small sub-fractional horsepower components which have high insulation resistance. Specify Option "J" for series 103 units to provide 0/100/1000/5000 microampere ranges. Specify Option "K" for series 105 units to provide 0/50/500/5000 microampere ranges. The multiple range leakage meter is a standard feature on the series 103/105.

HIGH CAPACITY — Volt-ampere rating of standard units is 50. This has been found sufficient for most applications. In cases where higher capacity is required, either because of the size of equipment being tested, or to meet the detail requirements of applicable specifications, Option "U" should be specified to obtain a 500 VA capacity.

RACK AND PANEL MOUNTING — Specify Option "C" for this type of construction. Units in ratings through 5000 volts are supplied on standard 10½" x 19" panels. 10,000 volt units are supplied on standard 12¼" x 19" panels.

AUTOMATIC RESET — Series 103, 105, and 103/105 testers normally "lock" on rejection, and must be reset manually. For some automatic installations, and for some applications in which retracting safety prods are used, automatic reset after rejection is desirable and this feature, Option "L," should be specified. This feature can be applied to late model units by simply installing a plug-in #103-050 Timer.

ZERO START INTERLOCK — Specify Option "D" for this feature which provides circuitry requiring the operator to always return the voltage control to zero before starting a test. This feature is standard on all 10,000 volt units.

PRICES AND ORDERING INFORMATION

SERIES 103 AC HIGH VOLTAGE LEAKAGE & BREAKDOWN TESTERS

Model 103-2.5	0/2500 AC Variable Test Voltage	345.00
Model 103-5.0	0/5000 AC Variable Test Voltage	450.00
Model 103-10.0D	0/10,000 AC Variable Test Voltage	795.00

PRICES INCORRECT
CONTACT FACTORY

SERIES 105 DC HIGH VOLTAGE LEAKAGE & BREAKDOWN TESTERS

Model 105-2.5	0/2500 DC Variable Test Voltage	445.00
Model 105-5.0	0/5000 DC Variable Test Voltage	550.00
Model 105-10.0D	0/10,000 DC Variable Test Voltage	925.00

SERIES 103/105 AC-DC HIGH VOLTAGE LEAKAGE & BREAKDOWN TESTERS

Model 103/105-2.5	0/2500 AC & DC Variable Test Voltage	600.00
Model 103/105-5.0	0/5000 AC & DC Variable Test Voltage	725.00
Model 103/105-10.0D	0/10,000 AC & DC Variable Test Voltage	1150.00

OPTIONAL FEATURES

A. Automatic Dwell Timing, 0.1 Sec. to 6 Sec.	Add	108.00
B. Automatic Dwell Timing, 3 Sec. to 3 Min.	Add	108.00
C. E.I.A. Rack & Panel Mounting	Add	7.50
D. Zero-Start Interlock	Add	47.50
E. Dual Range Voltmeter....(Specify Ranges)	Add	40.00
H. Combination Test Leads, to 5000 V. only	Add	20.00
J. Multiple Range Leakage Meter; Series 103 Units	Add	85.00
K. Multiple Range Leakage Meter; Series 105 Units	Add	75.00
L. Automatic Reset after rejection	Add	35.00
U. 500 VA Capacity	Add	150.00

FOR COMPLETE MODEL NUMBER, add the suffix letter corresponding to each optional feature to the basic number of the Model selected. For total price, add cost of each option to cost of basic model. For example:

MODEL 103-2.5 DE is a 2500 volt unit, with zero-start interlock, and a dual range voltmeter. Price is $345.00 + 42.50 + 35.00 = $422.50

Prices listed on this bulletin were correct on publication date, and are subject to change. Current price lists will be forwarded on request.

73401

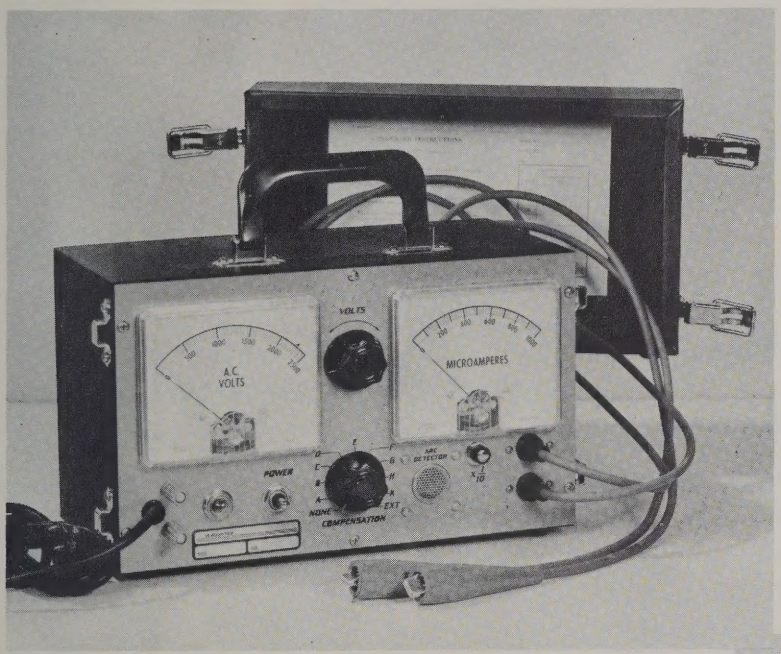
SLAUGHTER COMPANY — **ARDMORE, OKLAHOMA**

TWX 910-830-6972 — TELEPHONE: 405-223-4773

High-voltage Leakage Tester

checks insulation for...leakage ...grounds .....arcing

SERIES 122-125-122/125



PORTABLE

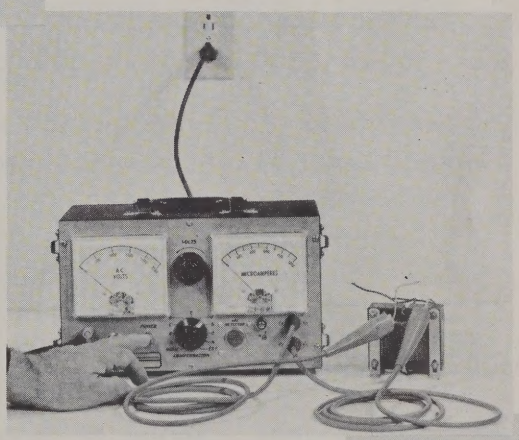
Handy for laboratory and field work

SENSITIVE

Dual range leakage meter

ACCURATE

Measures insulation leakage —not capacity current



FOR PRECISE TESTING

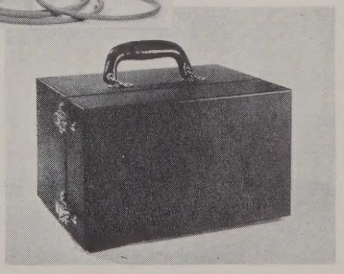
Use these testers for high voltage testing of all types of electrical equipment in the engineering lab, in field testing and in maintenance service. Use the Series 122 tester if only AC testing voltage is required, the Series 125 tester if only DC testing voltage is needed, or the Series 122/125 if both AC and DC testing voltages are needed.

DESCRIPTION

Basically, these units apply a known voltage to the insulation under test, and measure the current flow as an indication of insulation quality.

In AC testing, the load current often includes an appreciable capacitive component. When this is true, the compensation control may be used to cancel out the major portion of this capacitive current so that the meter reads essentially only the resistive component. In DC testing, the capacitive current is transient, and compensation is not needed.

AC tests provide data for a complete analysis of the insulation — total leakage, resistive leakage, AC resistance, power-factor, inherent capacity, and dielectric strength. DC tests provide data for insulation resistance in megohms, and dielectric strength.



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